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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/691,083	10/18/2000	Milton J. Boden JR.	IR1444 Div. (2-2480)	7041

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OSTROLENK FABER GERB & SOFFEN
1180 AVENUE OF THE AMERICAS
NEW YORK, NY 100368403

EXAMINER

KEBEDE, BROOK

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 01/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/691,083

Applicant(s)

BODEN ET AL.

Examiner

Brook Kebede

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Pursuant to the amendment filed on October 15, 2001 in Paper No. 5, the objection that forth in Paragraphs 1 and 2 has been withdrawn.
2. Pursuant to the amendment filed on October 15, 2001 in Paper No. 5, the claim rejection under 35 USC 112 first paragraph that set forth in Paragraph 4 has been withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Williams (US/5,248,627).

The rejection that set forth in Paper No. 3 is maintained and as of record repeated herein below.

Re claim 1, Williams discloses a MOS gated device which is resistant to single event radiation failure and having improved total dose radiation resistance; said device comprising: a P-type substrate (10 20) having substantially flat, parallel upper (20) and lower (10) surfaces; a plurality of laterally spaced N-type body regions (82 40) extending from said upper surface into said substrate (20); at least one respective P-type source region (84) formed in each of said body regions (82) in said upper surface of said substrate (20) and defining a respective channel region (40) in said upper surface in said body region ; a gate electrode (60) disposed atop and insulated

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from said channel region and operable to invert said channel region in response to the application of a suitable gate voltage to said gate electrode (60); and a source electrode (84) disposed atop said first surface (20) and connected to each of said source regions (82); said gate electrode being comprised of P-type polysilicon (see Figs. 1-7 and also Col. 2, lines 52-68 through Col. 3, lines 1-7).

Re claim 2, as applied to claim 1 above, Williams discloses all the claimed limitations including the limitation said gate electrode (60) is insulated from said channel region (62) by a gate dielectric layer (50) comprised of silicon dioxide (see Figs. 6 and 7).

Re claim 3, as applied to claim 2 above, Williams discloses all the claimed limitations including the limitation wherein said gate dielectric has a thickness of between 500 to 1000 angstroms (see Col. 4, lines 38-43).

Re claim 4, as applied to claim 1 above, Williams discloses all the claimed limitations including the limitation wherein each of said N-type channel regions has a doping concentration corresponding to that of an approximately 100 KeV phosphorus implant at a dose of about 5.5×10^{13} atoms/cm² (see Col. 4, lines 15-29).

Re claim 5, as applied to claim 1 above, Williams discloses all the claimed limitations including the limitation wherein each of said N-type channel regions has a doping concentration corresponding to that of an approximately 100 KeV phosphorus implant at a dose of about 8.0×10^{13} atoms/cm² (see Col. 4, lines 15-29).

Re claim 6, as applied to claim 1 above, Williams discloses all the claimed limitations including the limitation wherein said substrate (10 20) includes a chip of monocrystalline silicon

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at said lower surface of said substrate and an epitaxial layer formed atop said chip and that is less heavily doped than said chip (see Figs. 6 and 7).

Re claim 7, as applied to claim 1 above, Williams discloses all the claimed limitations including the limitation wherein said base region includes a portion adjacent to said upper surface that is more heavily doped than another portion of said base region that is adjacent to a lower boundary between said base region and said substrate (see Figs. 6 and 7).

Re claim 8, as applied to claim 1 above, Williams discloses all the claimed limitations including the limitation an interlayer dielectric layer formed atop said gate electrode and having openings therein in which said source electrode contacts said source regions (see Figs. 6 and 7).

Re claim 9, as applied to claim 8 above, Williams discloses all the claimed limitations including the limitation wherein said interlayer dielectric is low temperature oxide (see Figs. 6 and 7).

Re claim 10, as applied to claim 8 above, Williams discloses all the claimed limitations including the limitation wherein said interlayer dielectric includes dopant ions (see Figs. 6 and 7)

Re claim 11, as applied to claim 1 above, Williams discloses all the claimed limitations including the limitation a passivation layer formed atop said source electrode (see Figs. 6 and 7).

Re claim 12, as applied to claim 1 above, Williams discloses all the claimed limitations including the limitation wherein said passivation layer is comprised of low temperature oxide (see Figs. 6 and 7).

Re claim 13, as applied to claim 1 above, Williams discloses all the claimed limitations including the limitation wherein said gate electrode has a doping concentration corresponding to that of an approximately 50 KeV boron implant of about $5E15$ atoms/cm⁻² (see Figs. 6 and 7).

Response to Arguments

5. Applicants' arguments filed on October 15, 2001 in Paper No. 5 have been fully considered but they are not persuasive.

Applicants argued that "Williams does not show or suggest a gate electrode comprising p-type polysilicon in combination with other limitations of claim 1. Williams teaches a step of Boron implantation (Fig. 6, Step 92) using a polysilicon gate as mask..."

In response to the applicants' argument, the Examiner respectfully submits that such an argument is not commensurate with the scope of the claims, in particularly, as stated above. William (US/5,248,627) discloses p-type polysilicon in the background of the invention (see Col. 2, lines 52-60). Therefore, the rejection under 35 USC 102 is deemed proper.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondent

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (703) 306-4511. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Brook Kebede

BK
December 29, 2001


George Pourson
Primary Examiner
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